

# Guyana Economic Opportunities

**Environmental Management Systems and Clean Production:  
Options for Enhancing Trade Competitiveness of Small & Medium Export  
Manufacturers in Guyana**

David Gibson  
Chemonics International

Mark Bynoe  
University of Guyana

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## ACRONYMS

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ACP	Africa, Caribbean and Pacific Group
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
BOG	Bank of Guyana
BSE	Bovine Spongiform Encephalopathy
Caricom	Caribbean Community
CBH	Central Board of Health
CHPA	Central Housing & Planning Authority
CEPAA	Council on Economic Priorities Accreditation Agency
CIF	Cost, Insurance, and Freight
COD	Chemical Oxygen Demand
CP	Clean Production
CSME	Caricom Single Market and Economy
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
EPA	Environmental Protection Agency
FOB	Free on Board
FSC	Forest Stewardship Council
FSPS	Fire Services Prevention Section
FTAA	Free Trade Area of the Americas
GATT	General Agreement on Tariffs and Trade
GEO	Guyana Economic Opportunities Project
GGMC	Guyana Geology and Mines Commission
GMA	Guyana Manufacturers' Association
GNBS	Guyana National Bureau of Standards
GOG	Government of Guyana
GPPA	Guyana Poultry Producers' Association
GPL	Guyana Power and Light
GT&T	Guyana Telephone and Telegraph
HACCP	Hazard Analysis and Critical Control Points

IAS	International Accounting Standards
IAST	Institute of Applied Science and Technology
IDB	Inter-American Development Bank
IDB/MIF	Inter-American Development Bank/Multilateral Investment Fund
IFOAM	International Federation of Organic Agriculture Movements
IPR	Intellectual Property Rights
IRD	Inland Revenue Department
MIF	Multilateral Investment Fund
MOFTIC	Ministry of Foreign Trade and International Cooperation
MTIC	Ministry of Tourism, Industry and Commerce
NDC	National Democratic Council
NIS	National Insurance Scheme
QEHS	Quality, Environment, Health, and Safety
RDC	Regional Democratic Council
SME	Small or Medium-Sized Enterprise/Small and Medium-Sized Enterprises
SPS	Sanitary and Phytosanitary
TBT	Technical Barriers to Trade
THAG	Guyana Tourism & Hospitality Association
TSS	Total Suspended Solids

## **EXECUTIVE SUMMARY**

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### **Summary of Conclusions and Recommendations**

This section provides a review of the most significant findings, conclusions and specific recommendations with regard to the deployment of EMS and CP using pilot activities, grants, monitoring, and capacity building for small exporters of value added products. The following report details the data and analyses leading to the conclusions and recommendations below.

#### **Trade & Environmental Competitiveness**

- Decline in preferential treatment will increasingly affect Guyana's ability to export. Small and medium exporter manufacturers have benefited from significant protection that is rapidly disappearing and will increasingly have to compete on price, quality, volume and product differentiating features including agile management systems, environmental cost factors, and worker health and safety.
- Guyana must improve its competitiveness in conventional and progressive market places through branding and improved production processes that reduce costs and encourage external investment in processing equipment.
- Enhancement of cost competitiveness and access to export markets for natural resource-based products can be improved through installation of clean production technologies and better management practices when linked to environmental management systems.
- There are a few industries that are export oriented, dominated by small and medium enterprises, are keen to add value through processing, and are likely to adopt EMS and/or CP including: fisheries, forest products and perhaps poultry/meat.
- The small size, low level of vertical integration, broad inefficiencies, and historic trading markets for forest, fisheries, and agricultural products collectively act as a significant barrier to the adoption of and investment in improved environmental performance.

#### **Export Market Realities for Environmentally Friendly Products**

- The small size, insularity, and high transaction costs within most Caribbean markets for Guyanese products will not discriminate for or underwrite the costs of EMS/CP. Within the context of the IDB/MIF activities, the Guyana Manufacturers' Association (GMA) should work principally with export producers selling into American and European markets.
- Caribbean markets for fresh fruits, vegetables, meat and dairy are all very sensitive to phytosanitary restrictions which will require that Guyana finalize its conformity assessment and install the capacity to deliver, in a timely manner, credible SPS certificates. Phytosanitary and food safety requirements offer the best incentives to

establish EMS/CP practices for exporters selling principally into Caribbean product markets.

- Credible and timely veterinary and phytosanitary permitting is key to agriculture and forestry product development. Any GMA demonstration project or support that helps producers work cooperatively with GNBS will help build broad application of phytosanitary standards with positive impacts on all exporters.
- EMS/CP interventions (pilots, grants, capacity building) must be quickly linked to operating cost reductions and broader management improvements. High price sensitivity is likely to be a significant and negative influence on a candidate industry's willingness to adopt clean production and environmental management systems unless unit production costs can be quickly reduced to absorb additional expenditures associated with installing CP/EMS.
- Sales of forest, fisheries and poultry products are increasingly sensitive to various private standards for food safety, worker conditions, and broad environmental impacts of extraction and processing, but few of Guyana's current trading partners are currently demanding such features per se. These technical barriers to trade are purely private and are becoming additive to other public and multilateral regulations.

### **Capacity to Implement and Monitor Pilot EMS and CP Interventions**

- Guyana stands at a crossroads where access to new markets and direct investment will be dependent on the ability to provide timely quantities of goods with preferential features which will include application of environment, health and safety certification systems.
- The demand for such systems is growing throughout the Caribbean, the Americas and Europe and is already affecting trade in forest, fish, and agriculture products—Guyana's main primary products—though the country remains well behind its regional competitors in terms of regulation.
- There is currently no capacity to implement, accredit or audit to prevailing private environment, health, labor, or food safety labeling and certification systems, and dependence on off-shore expertise will limit adoption and increase costs.
- Monitoring the performance of EMS and CP technologies in pilots should focus on broad environmental criteria using simple measures for discharge improvements into water and air media near processing and not focus on toxilogical risk assessment or persistent contaminants.
- Caricom standards are key for credible export permitting, and completion of the national conformity assessment work underway at GNBS is also key to ensure equivalency and provides the assessment, auditing, inspection and third party recognition systems required for international recognition and reciprocity in environmental management, health and safety, and food safety systems.

## **Clustering Interventions to Maximize EMS/CP Reliability**

- Pick firms that are industry leaders which occupy visible positions in their industry associations and are willing to share the results of EMS/CP demonstration projects freely. Selected firms should have some demonstrated ability to impact value chain partners (up and downstream).
- To ensure broad sharing of demonstration, grants, and database information, EMS and CP precompetitive interventions should be emphasized and confidentiality agreements established with firms when commercial and proprietary information may be gathered.
- Wherever possible support demonstration projects which can directly and swiftly benefit multiple firms through joint implementation protocols for training, matching grants for technical assistance, and equipment. Cluster firms together wherever possible and fund only pilots where the firm(s) have financial stakes in the technology or training and meaningful support from senior management

## **Sector Interventions**

Based on the established criteria (small-medium firm size, export orientation, value-added processing, probability of adoption, and spread of improved EMS/CP) the rapid appraisal team recommends that the GMA-IDB/MIF interventions focus largely on the wood products, fisheries and meat and poultry industries. It is believed that these offer the best potential to install EMS/CP at the firm level and that these clusters offer enough broad industry leadership, internal replicability, and value chain influence as to be excellent candidates to develop demonstration projects in technology, capacity building, and institutional strengthening within GMA. Specific interventions include:

### **Fisheries Interventions**

- Installation of integrated (QEHS) management systems at 2-3 producers
- Clustering management system (e.g. ISO 9000) certification of significant exporters
- Increasing net useable yields of shrimp and sea bob
- Primary water treatment of package plant waste waters
- Identifying new products and markets for current waste streams
- Improving knowledge management within fisheries management
- Conduct study on fish ecology to ensure that over-harvesting of seabob is not occurring

### **Forestry Interventions**

- Conduct Auditors Training for Forest Certification
- Joint Ventures for Chain of Custody Forest Certification
- Install 2-3 pilot CP interventions to increase quality and pollution prevention
- Install small scale kiln dryers for furniture, decking and molding producers
- Vacuum dust recovery system located at primary and secondary milling
- Water curtains for spray finishing booths at 1-2 furniture plants

## **Poultry, Meats and Dairy Interventions**

- Install QEHS at 2-3 poultry processors and at the one private abattoir that has the potential to export
- Conduct conformity assessment of applicable SPS standards & identify gaps to insure equivalency, and provide the assessment, auditing, inspection and third party recognition systems required for international recognition and reciprocity
- Conduct comprehensive review of Caricom & member SPS/veterinary requirements for export of meat and poultry
- Develop waste & sanitation BMP manual and website for meat & poultry exporters
- Develop small loan quarantine facility for improvements in poultry operations
- Primary water treatment of medium and large poultry processing plants and abattoirs
- Identifying markets for current waste streams



## SECTION I

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### Introduction

Globalization poses significant opportunities and obstacles to historically protected Guyanese manufacturers. The trade liberalization effects of the Doha Round of The General Agreement on Tariffs and Trade (GATT) are being reinforced by the Free Trade Area of the Americas (FTAA) and to a lesser extent by recent progress in finalizing a new phase of the Caribbean Basin Initiative. Collectively these new trade regimes will improve Guyana's ability to participate in unfettered markets for both imports and exports of manufactured goods.

But such reductions in tariffs, import quotas, and preferential trade subsidies can only help Guyana's manufacturers if they are prepared to compete within value chains and product markets that are increasingly sensitive to obtaining quality components at competitive prices and volumes. This is particularly true in natural resource-based industries such as forestry, agriculture, fisheries and mining where global buyers are applying consumer preferences and corporate social responsibility requirements.

Products with favorable environmental, health and safety, and social features are competing in more lucrative markets where these technical barriers to trade (TBT) are becoming realities. More importantly, firms that are meeting these evolving norms have documented and proven management systems that give buyers confidence and improve competitive agility in dynamic markets.

The marketing of Guyana's small and medium exports reflects its traditional economic ties and a substantial reliance on preferences to overseas markets. The negotiating initiatives are:

- At the regional level there is the Caribbean Single Market and Economy that aims at economic integration within the Caribbean Community (Caricom). The organizing strategy is based on open regionalism and collective engagement of negotiating partners.
- At the hemispheric level, Guyana is preparing for entry into the FTAA by 2005. This bloc represents the largest concentration of Guyana's current trade, accounting for more than 40 percent of the country's exports and more than 50 percent of its imports (MOFTIC, 2003).
- At the international level the World Trade Organization (WTO) launched the Doha Development Agenda in 2001. These negotiations covered a wide range of issues, including market access for goods and services, agriculture, new rules affecting trade-related aspects of investment, trade-remedy laws, and other topics.
- Also at the international level the European Union (EU) is preparing to renegotiate the terms of its preferential arrangements with the Africa, Caribbean, and Pacific (ACP) countries. These preferential arrangements affect key Guyanese exports such as rice and sugar. The WTO waiver for the preferences is set to expire in 2008, and negotiations began in September of 2002.

There are also a number of bilateral pacts. Guyana has numerous, complex trade ties, especially given its small size, which leads to its continued status as one of the most preference-dependent countries in the world. Eventually, however, all of these trading arrangements will fall under the umbrella of the WTO, thus the phasing out of preference.

The (GMA) has submitted a proposal to the Inter-American Development Bank's Multilateral Investment Fund to improve the competitiveness of small and medium sized Guyanese exporters by fostering improved environmental management systems (EMS) and support for the adoption of clean production (CP) technologies. In partnership with the Environmental Protection Agency (EPA) and the Institute of Applied Science and Technology (IAST), the project will identify and support installation of pilot CP technologies and environmental management capacity through grants, training, and information management systems which will help document and further extend EMS and CP results through pilot interventions and capacity building. The GMA program will seek to identify key export industries which will benefit from the development, testing, and promulgation of EMS and CP through pilot interventions.

### **Scope of Work, Methods, and Team**

(See Annex A.) The first phase of the project called for a survey to focus the work and improve relevancy and application within current export markets. The GMA requested USAID/Guyana Economic Opportunities project (GEO) assistance in conducting a rapid industry appraisal in order to:

- Determine priority sectors for EMS/CP
- Identify possible interventions under MIF/IDB
- Suggest sector specific expertise for identified initiatives

The 10 day assignment required that the consultants review the available literature on trade and environmental competitiveness, meet with senior industry and government representatives, and conduct rapid environmental reviews of candidate industries. GEO engaged a senior environmental management systems and natural resources planner (David Gibson) and a trade competitiveness economist (Mark Bynoe, Ph.D.) to conduct the survey and make recommendations for the GMA/IDB/MIF project.

The purpose of this report is to make preliminary determinations for selected industries and detailed suggested interventions for a second phase which will provide more sector-specific short-term assistance and help direct GMA's further use of the IDB/MIF project support. This survey provides a broad overview of possible clean production technologies and environmental management systems interventions to determine which would be most likely to succeed and be adopted by the various industry clusters.

As there are no guarantees that the IDB/MIF will support the submitted project the study was broadened to provide advice to GMA which might be valuable to other donors and projects interested in environmental competitiveness and trade in Guyana. Initial results were shared and discussed at a well attended seminar on environmental competitiveness held on April 9, 2004 at

GMA headquarters. Annex B provides the meeting schedule and Annex C provides a list of attendees.

### **Acknowledgements**

The team wishes to acknowledge the enthusiastic and insightful support it received from the management at GMA. The team would also like to acknowledge the great support it received from the GEO office team and representatives from the EPA and the Guyana National Bureau of Standards. In particular the team would like to express its appreciation to the numerous manufacturing executives who provided their valuable time and candid information without which this survey would have been impossible. USAID's financial support for the project is certainly appreciated and should be recognized as an in-kind contribution to the IDB/MIF project.



## SECTION II

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### Trade Competitiveness & the Environment

In recent years the world has seen a growing awareness of health and environmental issues, and sustainability has become the key word for discussion of economic development. Increased consumer awareness and corporate risk management strategies of multinational producers and retailers are stimulating the proliferation of private standards for environment health and safety. Interest in private standards is also accentuated by the swelling importance of supermarket chains and their need to have larger and more reliable contracts with producers.

The international community is also becoming steadily more conscious of these issues and government policies in both the developed and developing worlds are increasingly formulated to encourage production technologies that are clean and environmentally friendly. Guyana has been at the center of several forestry and mining controversies that have made these concerns quite real. As preferential trade regimes erode and products must stand on their own merits, environmental and social risks become important discriminators for investors, buyers, and consumers alike.

At the industry level interest in CP/EMS has increased for several reasons related to concerns for food safety, health and the environment. These concerns include:

- The intensive use of artificial fertilizers, pesticides and artificial growth promoters in modern agriculture and plantation forestry has measurable and well documented impacts on surface and ground water. Other environmental impacts of concern are caused by: water use and contamination, land clearing associated with production increases, and loss of attendant biodiversity from adjacent fragile and protected areas.
- The growing consumer awareness of environmental risks of the effects of modern farming methods on personal health and safety. The exponential growth and current price premium in certified organic products are a direct testament of consumers' desire to have safer and more natural foods perceived to be of higher nutritional value.
- Increasing frequency and severity of food scares is raising public concern over food safety, i.e., the BSE<sup>1</sup> scare of beef in Europe, the dioxin scare that affected meat originating from Belgium in 1999, the recent hepatitis epidemic associated with Mexican onion imports to the United States, and the report of cattle in the Netherlands in 1999 having a virus resembling Acquired Immune Deficiency Syndrome (AIDS).
- Intense media attention and the role of NGOs have played a key role in raising consumer awareness and mobilizing purchasing power, and thus raising interest in clean production methods. The proliferation of third party labeling and certification systems are

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<sup>1</sup> Bovine spongiform encephalopathy (BSE), widely known as "mad cow disease," is a chronic, degenerative disease affecting the central nervous system of cattle.

increasingly useful in differentiating products beyond convention quality and incorporating these changes to consumer preferences.

The challenge for the effected industries, therefore, is to remain price competitive within Guyana in light of the Caricom Single Market and Economy (CSME) and the other international agreements. Furthermore, it is prudent to assume that competitive prices must include the costs of meeting international standards for food safety and marketing as safety and marketing standards must now be assumed as ‘given’.

Notwithstanding the above scenario for export, there is a seeming eagerness among local producers to enter the export market. Much of the attraction is about the earning of foreign exchange and expanding market opportunities. There is support for the export orientation within the Ministry of Tourism, Industry and Commerce (MTIC), which is currently developing trade policies to facilitate the stabilization of the local sector and its expansion into at least the Caricom market. The removal and/or reduction of consumption taxes and duties on essential inputs by the Government since 1993 helped to catalyze the growth of the sector.

### **Measuring SME Environmental Performance Change**

The last 10 years has seen a proliferation of international trade standards, which have become a standard feature of the global economy. The standards have moved from simple interchangeability and visual features that guaranteed component interchangeability to quality standards that ensure consistency and incorporation of desired features (color, size, ripeness, humidity). Most recently the notions of quality have shifted to embrace growing consumer concern for environmental values, food safety considerations, and attention to labor conditions of overseas producers. Standards can be classified in three broad categories: mandatory, voluntary and private. Standards are mandatory when they are set by governments in the form of regulation such as sanitation and phytosanitary standards (SPS). These affect trade by placing technical requirements—testing, certification and labeling procedures—on imported goods or exported goods. Most governments, including Guyana’s, rely on standard enforcement through ex post liability rules that allow punitive damages to be awarded to the buyer in case of non-compliance or simply banning non-compliant products.

#### **Private Grades & Standards**

Grades and standards are the language of trade. To ensure the competitiveness of developing country producers it is imperative that systems for affordable access and credible implementation of these standards are established. Emerging standards are both complex and dynamic, incorporating features that go beyond simple quality, to less apparent characteristics of safety, environmental management and human rights. This has been driven by the pervasive business philosophy of the Triple Bottom Line: Economy, Society and Environment.

There remains, however, an uneven understanding of how these emerging standards can be implemented in the context of developing countries. Producers and suppliers must speak a common language based on these standards and a realistic accreditation and auditing infrastructure. Only when there is common understanding about grades and standards and the capacity to implement them, can the benefits — financial, social, and environmental — be felt by all links in the value chain.

Voluntary standards generally arise from a formal coordinated process in which key participants in a market or sector seek consensus (e.g. any of the 7,000 standards set by the International Standardization Organization). Some of these are also introduced as a response to consumer or

value chain requests (such HACCP, ISO 14001) or as a result of NGO initiatives (e.g. FairTrade, FSC, IFOAM). Voluntary standards are usually verified through third-party auditing systems.

Private standards are usually developed and monitored internally by individual enterprises or associations of like-minded enterprises. Food safety standards are a good example where processors and retailers generally have had their own internal codes of conduct which have recently been upgraded to shared concepts among food retailers through the Euro-Retailer Produce Working Group and its certification system known as EurepGAP.

The distinction between mandatory, voluntary and private standards, however, is becoming increasingly blurred. Although voluntary standards are not mandatory by rule, some of them (such as the ISO 9000 standards on quality management) have become de facto standards, meaning that they are required for producers if they want to compete globally. The distinction between private and voluntary standards is to some extent arbitrary because many private enterprises adopt the principles of voluntary standards. For example, while few companies have embraced the entire SA8000 series for social and labor standards, many large agricultural multinational corporations (e.g. Dole, Chiquita, Parmalat) are incrementally adopting their provisions. Negative publicity from civil society organizations and the subsequent threat of declining sales require corporations to adhere to voluntary and/or private standards. Additional and direct incentives for adopting voluntary and private standards include lowered liability and thus reduced insurance premiums. Adherence to standards generally leads to improved management and reduced operational risk, which in turn naturally leads to easier access to credit and reduction in liability and health insurance.

#### **Social Accountability 8000**

Introduced in 1997 by the CEPAA, SA 8000 is a consensus-based standard for companies interested in assessing, monitoring and influencing the social accountability of their suppliers and vendors as well as their own facilities. The standard was adapted to agriculture in 1999 after Dole participated in two pilot audits at the end of 1998. With independent certification of recognized standards and regular audits conducted by third-party experts, SA 8000 helps companies in widely varied industries assure that their activities adhere to a set of enforceable management standards.

Finally, mandatory standards may be incorporated in regulation. A cumulative reading of these changes may suggest that “private” regulation is—if not de jure, at least de facto—substituting public regulation in determining what characteristics products and production/process methods need to match to be fit for trade.

Finally, several countries are providing “regulatory relief” and reduced auditing and fines to companies that establish private and voluntary standards and allow third party inspection. Omai Mining’s adoption of ISO 14001 was negotiated after its disastrous tailing pond failure. Similarly, countries such as the Philippines have encouraged adoption of voluntary standards through policy and fiscal incentives (ISO 14001) in the sugar industry and others such as Guatemala have made adoption a requirement for operations in certain places (e.g. Forest Stewardship Council for community forest concessions in the Maya Biosphere Reserve).

### **Integrating EMS and CP and Measuring Performance**

Environmental management systems and clean production technologies seem to be most successful when they are inextricably linked through information management which captures

improvements in efficiency and reductions in cost. The overwhelming evidence suggests that EMS or CP, by themselves, do not justify the real costs of implementation but that when they are blended within management and reporting infrastructure they become a driving and sustainable force within manufacturing. This is particularly true in a country like Guyana where preferential trade and domestic industry protection has insulated almost all industries from the application of environmental standards, pollution prevention, or needed investments in clean production for inefficiencies sake. Less than 10 firms in Guyana are currently registered to the ISO standards, most to the ISO 9000 quality series (feed stocks, rice milling, ship building, confectionary, and shipping) and only one firm (OMAI Mines, Ltd.) to the environmental management standards ISO 14001.

Oftentimes the standards for environment, safety, and quality management, particularly when trade is involved, are depicted as either process or performance standards where the former simply outlines the chain of command and document paths, while the latter tends to be more quantitative and empirically based. Typically EMS is designated as a process standard that answers questions on how things are done and defines by whom and how environmental risk will be determined and managed. While such systems are most often reactive, a well-installed EMS empowers employees, management authorities and other stakeholders with the ability to identify and participate in the correction of problems. This often defines the success and vitality of EMS and is more an attribute of management conviction and a healthy corporate culture than a reflection of the actual standard (e.g. ISO 14001). The new Guyana Standard for Good Management Practice for Micro and Small Enterprise appears to be based on this proactive model.

This discussion of standards is important because GMA's request for IDB/MIF support for the installation of clean production technologies will very likely be closely tied to the adoption of such standards. CP is much more effective when incorporated into management systems that have continual improvement drivers where staff and management move beyond "one off" pollution control interventions to the systematic identification of improvements that continually reduce costs, improve product quality, and better comply with public regulations and dynamic supply chain requirements. It is quite likely that interventions that simultaneously address environment, health and safety, and quality management are likely to be the most successful in the immediate and long term to exporting SME's.



## SECTION III

### Overview of SME Export Manufacturing Sectors

In this section we review the performance of small and medium export enterprises in the Guyanese economy. We look at their efficiency, integration, and vulnerability to export cycles, which will lay an important foundation for selecting and positioning these industries for consideration under the IADB/MIF environmental program.

In recent years, the prices Guyana has been able to realize on the export of its important agricultural commodities has had significant effects on the trade balance, on consumption and on private investment (Table 1).

**Table 1. Annual indicators, 1996-2002<sup>2</sup>**

Indicators	1996	1997	1998	1999	2000	2001	2002
Real GDP growth at factor cost (percent)	7.0	6.2	-1.7	2.9	-0.7	2.3	1.1
Consumer price inflation (ave; percent)	7.1	3.6	4.6	7.5	6.1	1.9	6.1
Exports of goods fob (US\$ m)	552.8	573.4	525.0	504.8	502.7	487.1	490.8
Imports of goods CIF (US\$ m)	595.0	641.6	601.2	550.2	585.4	-775.4	758.9
Current-account balance (US\$ m)	-53.8	-105.1	-98.5	-75.2	-113.4	-128.3	-106.7
Reserves excl gold (US\$ m)	329.7	315.5	276.4	268.3	296.6	187.2	183.7
Total external debt (US\$ m)	1,654	1,635	1,686	1,527	1,400a	-1,196.7	1,237
Debt-service ratio, paid ( percent)	14.4	17.6	19.5	16.0a	17.0 a	18.6	-
Exchange rate (ave; G\$:US\$)*	140.4	142.4	150.5	178.0	182.0	189	190

\*August 17th 2001 G\$180.5: US\$1

Source: The IDB, Bank of Guyana Research Department, and IMF sources, 2001, Budget Speech, 2003.

The specific challenges faced by Guyana include: a market that is too small to support cost-effective production of its industrial, natural resource and agricultural products; reliance on two agricultural products which depend excessively on preferential access that will soon disappear; and on royalties from a gold source which may soon be economically depleted. Additionally, the need for an efficient and well functioning infrastructure, a legal system in which there is confidence, and a cheap source of capital for clean production technology investments, cannot be over-emphasized. Furthermore, an enabling environment with less political tension, reduced levels of personal and industrial crime and a strategy that is export-promotion led should be prerequisites for Guyanese policy makers. These are all long-term requirements that will favor the export of raw and semi processed products which require more modest capital investment.

All of these factors suggest that price will remain the defining feature for most raw and semi-finished Guyanese products. Internal and Caribbean markets do not yet show any measurable

<sup>2</sup> From National Diagnostic Study, p ii, prepared for Caricom by Arden & Price Consulting, June 2002

preference for sustainably managed or environmentally “friendly” natural resource products. From our review there seem to be no environmental premiums in domestic or regional markets. Thus, investments in CP/EMS must have no net effect on cost and, in fact, should be geared toward reducing unit production factors. The most significant incentive for the adoption of CP/EMS will be unrestricted access to markets. This is a key point with regard to selection of industries and firms for CP/EMS interventions.

Guyana’s exports are dependent upon a narrow range of goods and are dominated by natural resource and agro-based products (Table 2). Between 1993 and 2002 they accounted for between 78 percent and 80 percent of total domestic exports, and were led by sugar, which by itself accounts for about a quarter of total exports. In 2002, Guyana’s main productive sectors contracted due to the sustained deterioration of world prices and Euro depreciation. As a result, export revenue declined 17.0 percent for rice and 18.4 percent for bauxite, stagnated for sugar, and increased 7.5 percent for gold. Export revenues of diamonds, timber, shrimp and other non-traditional goods increased by 4.0 percent.

**Table 2. Domestic Exports (f.o.b.) (US \$Million)**

Period	Total	Bauxite	Sugar	Rice	Shrimp <sup>1</sup>	Timber <sup>2</sup>	Molasses	Rum <sup>3</sup>	Gold	Other
1993	404.0	91.1	116.3	33.0	11.4	4.5	1.4	9.3	99.8	37.2
1994	447.4	76.4	116.4	55.6	13.1	7.9	0.6	11.5	128.0	37.9
1995	478.9	82.9	125.5	76.5	3.1	8.3	0.4	3.0	94.7	84.5
1996	552.8	69.8	150.7	93.8	12.6	8.9	0.4	11.5	103.5	101.6
1997	573.4	89.4	133.4	84.7	20.2	44.6	0.7	8.6	139.8	52.0
1998	525.0	78.5	129.0	73.3	18.5	31.0	1.2	6.2	124.0	63.3
1999	504.8	77.2	136.2	71.1	29.2	37.3	2.3	7.5	108.7	35.2
2000	502.7	76.3	118.8	51.8	47.1	35.2	2.4	7.2	123.3	40.6
2001	487.1	61.0	109.2	50.2	49.3	33.0	1.6	7.9	127.0	47.9
2002	490.8	35.3	119.6	45.4	52.6	35.7	2.8	9.0	136.3	54.3
2003 <sup>4</sup>	353.9	36.2	82.1	29.9	41.5	21.6	1.8	4.3	89.4	47.1

Source: Bureau of Statistics.

<sup>1</sup> From 1987 figures include exports from non-residents.

<sup>2</sup> From the first quarter of 1997 figures include Barama's export.

<sup>3</sup> Includes Neutral spirit.

<sup>4</sup> As at September 30, 2004

The high dependence on commodity exports means that Guyana’s economy is extremely vulnerable to cyclical movements in commodity prices. This is despite the existence of preferential markets for its agricultural exports, since even these markets are not immune to the vagaries of world market prices. Price sensitivity is likely to be a significant and negative influence on a candidate industry’s willingness to adopt clean production and environmental management systems unless unit production costs can be quickly reduced to absorb additional expenditures associated with installing CP/EMS. Industries dominated by larger firms that export to less environmentally sensitive markets (e.g. hardwood exports to Asia or the Caribbean) are not likely to lead the charge toward sustainability.

In relative terms timber, shrimp and rice products are contributing roughly the same levels of total exports as in 1993. In terms of trends only timber, shrimp and gold are showing longer-term growth and the relative ability to compete as preferential treatment and protection decline.



## SECTION IV

### Manufacturing Sectors & Exports

The Guyanese economy is primarily resource-based and is dominated by small and medium-sized operations. Agriculture, mining, and forestry account for more than 50 percent of GDP, manufacturing and services account for only 24 percent, and the remaining 26 percent is government expenditure (Ministry of Finance, 2004). However, estimates of the contribution by SMEs to these sectors are not available.<sup>3</sup> In the agricultural sector, rice (dominated by small and medium sized operators and millers) and sugar (products of paddy and sugar cane respectively) account for a substantial portion of output, and are sold on preferential basis to countries in the EU.<sup>4</sup> Further, there have been significant increases in the contribution of poultry and seafood to the GDP.

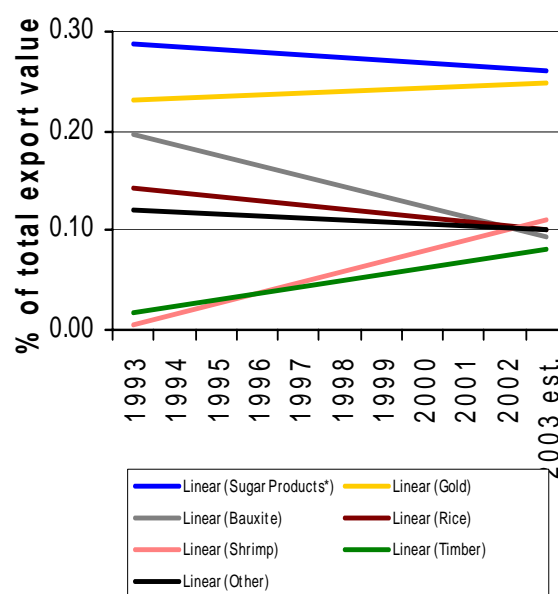
#### Primary manufacturing sectors and export trends

Since embarking on a series of market-oriented reforms in 1991, Guyana had experienced strong and consistent economic growth, but this progress has stalled since 1998 with the economy remaining sluggish up to the end of 2003.

#### Heavy manufacturing and nonrenewable mining

In recent times Guyana has been showing potential for medium-term growth in the mining and forestry sectors. An unknown area of potential is the prospect of offshore oil in Guyana's Exclusive Economic Zone (EEZ), a possibility that is beginning to be explored by international firms. Four oil companies, Esso, CGX Energy, Maxus Guyana Limited, and Century (Guyana) Limited, are currently pursuing offshore exploration possibilities. However, ongoing maritime boundary disputes with Suriname and Venezuela have adversely affected prospects for realizing off-shore production. Some of these same territorial disputes are relevant to the demersal and shrimp fisheries industry is well. Land-based oil exploration is also being pursued, most recently by Hardman Resources M.L., which is seeking a license for the entire Takatu Basin in Southern Guyana, an area of 10,000 square kilometers. While there are implications for the successful installation of environmental management systems and clean production technologies, heavy

**Figure 1. Relative Value of Guyana's Export Commodities 1993-2003 (linear trends)**



<sup>3</sup> There is no entity in Guyana collecting information specifically on the SME sector. In fact, there is no acceptable working definition of the SME sector applied nationally. This made the EMS/CP classification more subjective.

<sup>4</sup> In two recent studies, one by the Guyana Lands and Surveys Commission (GLSC, 1998) and another by Mott MacDonald (2004), it was found that approximately 60 percent of rice farmers were farming plots of land less than 30 acres of land.

manufacturing and nonrenewable mining industries are dominated by large and multinational corporations and add little value to raw products. However, all of these companies are under enormous pressure from stockholders, regulators and communities to reduce their environmental footprints, so their actions can be beneficial in increasing awareness and functional EMS/CP literacy.

### Non-Petroleum Mining and Quarrying

The mining and quarrying sector is dominated by primary production, with little forward or backward integration. Thus, it did not meet the requirements set out in the TOR for consideration in this study.

The gold mining sector has for the past ten years been dominated by Omai Gold Mines Limited (OGML). However, the recent movement of Brazilian miners across the border to the Guyana side has had some positive impact on gold declarations (see Figures 2 and 3), along with significant negative environmental side effects like, river and stream siltation, water impoundment, and increased water pollution, due in large part to the indiscriminate use of mercury and increasing use of cyanide for extraction.

The quarrying sector, like the gold and diamond mining operations, is mainly a primary sector activity, dominated by medium scale operations, like BK International, Mazaruni Granite Company, and Big Hope Mines.<sup>5</sup> Most of these mines are geared toward supplying the local market and conduct little or no exporting.

### Cottage and Artisan Industries

Some small manufacturing enterprises are being created and many existing operations will be re-tooling. Areas such as primary materials, agriculture and some consumer products are poised to become growth industries. Local products such as jams, jellies, sauces, processed spices, and fruit puree blends show much potential for increased production and export. Some of these products are currently being exported to West Indian and diaspora markets in Europe and North America. However, there is much room for improvement in the quality of these products as well as mandatory improvements in labeling and packaging of these

Figure 2 : Gold Declaration

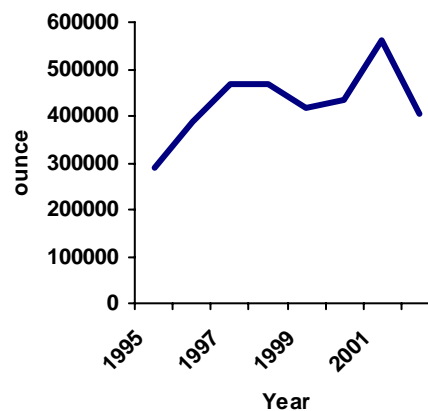


Figure 3. Smaller gold mining operations pose significant challenges to regulation and installation of voluntary EMS/CP. (Photo: D. Gibson).

<sup>5</sup> This is one of the mines that fall under the Baracara management.

products if they are to remain on the shelves. Traceability and labeling restrictions are increasing rapidly after recent food safety scares in North America and the European Union. The quickly promulgating standards could negatively effect Guyanese exports in the not too distant future. As will be discussed below increasingly stringent labeling and phytosanitary requirements have broad implications for Guyana's National Bureau of Standards as well as development of voluntary certification programs, including EMS.

### **Poultry, Meats and Dairy**

Currently there are no exporters of poultry, meats<sup>6</sup> or dairy from Guyana, but there are several firms in each attempting to enter Caribbean markets. Given the paucity of data in meats and dairy our work focused largely on poultry. We believe that the complexity and “value added” within poultry offers the best fit for GMA interventions and a good lens through which the other two subsectors can be viewed.

The poultry industry experienced rising growth during the period of state control, particularly in the early 1980s, when economic pressures and foreign currency limitations resulted in the curtailment of vital inputs (hatching eggs, feed, and drugs) for the industry. During this period, the increasing role of the state in the productive natural resource-based sectors of the economy severely distorted incentives for private sector involvement. State control on prices for most food items, including poultry products, and the maintenance of overvalued exchange rates discouraged domestic poultry production and encouraged imports of poultry meat and table eggs, mainly from the United States. Import concessions on equipment purchased<sup>7</sup> have, *inter alia*, resulted in a revival in the local poultry industry, as local producers were able to produce at a more competitive price. It remains the Government of Guyana’s stated policy to offer the industry some level of protection to reduce its vulnerability to imports, without contravening Guyana’s WTO or other multilateral trade commitments.

Some of the protection afforded the poultry industry comes in the form of indirect subsidies through ground and surface water contamination occurring near farms and processing facilities. Unregulated proliferation of raising farms on shallow water tables in coastal areas is causing localized pollution (eutrophication) of streams and contamination of drinking water. Limited markets for used raising bed materials (wood shavings, rice hull) means that such concentrated and potentially valuable waste is concentrated and discarded randomly after each 55-60 day rearing cycle.

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<sup>6</sup> One Guyanese firm has recently started exporting beef to the Caribbean after a hiatus of almost 30 years due to hoof & mouth disease.

<sup>7</sup> This concession is mainly in the form of waivers on import duties.





## SECTION V

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### Export Industry Efficiencies, Trade and Environment

It has been shown that it would be possible to improve the profitability of the forestry, seafood, and poultry sectors through improved efficiency levels. For example, in the case of forestry, Bynoe (2001) found inefficiency levels ranging from 56 to 72 percent using panel data during the period 1995-1999. The authors are not aware of any other efficiency studies that have been conducted for these sectors. This high level of inefficiency was associated with the use of outdated and/or inappropriate technology, signaling the need for retooling. Furthermore, the high overheads often associated with operations and poor recovery rates in these sectors have been posited as contributing factors.

In preparation for the upcoming FTAA negotiations, several countries have been improving their SPS status, which will serve as a legitimate barrier to trade while opening up markets to those poultry industries that can meet these standards as tariffs are reduced. Chile has now achieved salmonella incidence levels of less than 1 percent (compared to 20 percent in the USA). Costa Rica is New Castle Disease free, the Dominican Republic is about to be declared free of New Castle and Avian Influenza disease, Belize is about to be declared free of Avian New Castle and is striving to be declared free of three other poultry diseases. The GPPA, with the support of the Caribbean Poultry Association (CPA) and the Canadian funded Caribbean Project for Economic Competitiveness (CPEC) is engaged in a program to improve the SPS status of the Guyanese industry but will require 3-5 years to attain similar disease free status.

Additionally, continued subsidization of the agricultural sector under the U.S. Farm Subsidization Program and the Common Agricultural Policy (CAP) in the European Union are likely to continue to exert downward pressures on the price of products being produced in smaller countries like Guyana, more so in a period of globalization. Recently there has been an 80 percent increase in guaranteed subsidies to U.S. farmers of \$180 billion over the next 10 years, a proposed increase in subsidies by Canada to its farmers of \$5.2 billion, \$40 billion paid to European farmers, and \$60 billion paid to Japanese farmers. One sector that is likely to be adversely affected as a result of these subsidies offered is the rice industry which has seen export prices for the commodity falling by nearly 100 percent since 1996. To the extent that this slump in prices may continue, some rice farmers are likely to transfer resources out of the industry. Since rice by-product remains a major input into the feed industry in Guyana, the poultry industry can be affected with reduced by-products being produced, leading to an increase in the input price of this product and hence an increasing price for the final product, i.e., poultry meat.

### Identifying & Measuring Environmental Risk

The focus of the GMA and IDB/MIF is a broad array of environment, and occupational health and safety areas for intervention. The most visible attention on environmental issues in Guyana largely has been given to broad ecological problems with particular attention to biodiversity decline and inland aquatic damage from mining and forestry activities, respectively. These are landscape-scale effects that depict qualitative erosion of natural resources in ways that are oftentimes of more importance outside of Guyana than operating industries within the country.

Decline in global carbon stocks, loss of endangered species, or the effect of deforestation and sedimentation in Caribbean waters have not entered into investment decisions at the industry level or within the government of Guyana. Most extractive industries have operated with impunity and done little to differentiate their products or production processes on the merits of either efficiency or environmental performance.

On the other hand, the EPA seems to be much more focused on environmental health and safety issues – such as the fouling of drinking water and worker exposure to contaminants – which are likely to be of much more immediate concern with regard to trade competitiveness. The EPA is developing more quantitative standards and measuring protocols to determine the acceptable limits of pollution and hazardous waste disposal. In addition, the EPA is rightly concerned with the overall land use planning capacity and zoning infrastructure at the municipal level and are paying much closer attention to various environmental nuisance factors including noise and unsightly solid waste mismanagement.

While various certification and labeling systems for internationally traded products now tend to focus on the balance between broad ecological health and exposure to pollutants (health & safety) it is important to recognize that the management systems and evaluation criteria will likely be different for both. Interestingly, the Guyana National Bureau of Standards is developing conformity assessment capacity and harmonization systems that will eventually reconcile broad ecological and environmental health and safety attributes into internationally accepted standards. The recently established Guyana Standard “good management practices for micro and small enterprises” (GYS 231:2003) recognizes the confluence of these interests and tries to place them within the grasp of the small enterprise.

Ecological considerations normally occur outside of the property of processing facilities and are measured in deforestation, loading of receiving waters with sediments or oxygen depleting sugars, fouling of air, solid waste stockpiling, or simple noise emissions. Exposure to toxics and emissions of persistent contaminants normally require use of health risk assessment and much more precise measuring instrumentation. Given the resources available through the GMA project, the costs and difficulties in meeting laboratory conformity, and the need to make this replicable strongly suggest that the IDB/MIF pilots should focus on broad environmental loading measures wherever possible.

### **Performance Measurement and Monitoring Systems**

The GMA proposal calls for the close monitoring of pilot EMS/CP interventions to gauge their effectiveness and stimulate broader interest. This is a key component as it has been determined in most other situations that without a well organized collection, analysis, and communication of improvements popular proliferation of EMS and/or CP either fails or lags beyond potential demand. This is particularly true absent strong regulatory enforcement or other non-market incentives and where cost considerations and possible market exclusion due to TBTs are the real drivers.

Measuring performance of pilots should focus on simple indicators of improved efficiency and reduction and reuse of air, water and solid waste streams. The GMA and EPA should resist the urge to immediately move to complex environmental health risk reduction models which require

more complex measures and laboratory equipment currently not available in Guyana. On the intake side GMA and EPA should focus on simple, broad environmental quality parameters for measuring energy, water and raw material reduction. While choosing parameters for waste which include some measure of ecological and health risk quantitative proxies, such as chemical oxygen demand (COD) and total suspended solids (TSS) for water discharges.

### **Optimizing Leverage within Selected Value Chain**

To maximize the value of limited IDB/MIF resources and ensure broader scale for replication with other industry members, the project pilots must be carefully selected within the overall value chain. Pilot interventions in EMS and CP should be located along the value chain where they can affect changes in both provision of the raw materials (fish, feed, logs, ore) as well as the ability to respond to upper supply chain requirements. Pilots should be carefully evaluated and cited where there seems to be some demand from buyers and some possible impact on suppliers.



## SECTION VI

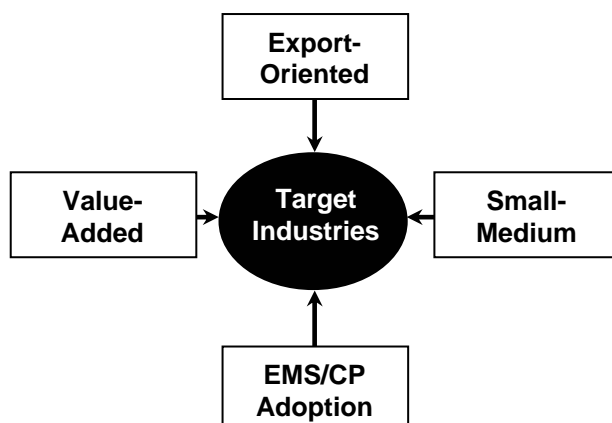
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### Industry Sector Selection

The GMA and the IDB/MIF focused their interventions on small and medium sized manufacturers of exported products. Selected industries must add value in Guyana through processing. It also means that selected sectors and illustrative industries are either currently exporting product or are close to having this capacity. Lastly, the criteria included a nominal size of enterprise which was more suggestive of multiple firms vying for similar market positions rather than absolute employee or turn over numbers. The intent of these three criteria was to establish EMS/CP technology pilots and model management systems that could be broadly applicable for many of Guyana's potential exporters.

Conventional agriculture products that are exported in bulk (e.g. paddy rice), or products that are processed by large confectionary or distillation companies (e.g. cane and molasses) were eliminated from consideration. Fresh fruits and vegetables were also eliminated from further consideration due to the low level of value-added processing. Additionally, tourism, which could arguably be labeled as a value-added natural resource-based export, was excluded because it is supported through various interventions managed by the Guyana Tourism & Hospitality Association (THAG).

Two additional criteria became more explicit during interviews with the GMA and multilateral support institutions: 1) the industries, to the greatest extent possible, should be based on the extraction and use of natural resources and; 2) candidate industries should have the potential to adopt the EMS and/or CP interventions. In many ways the requirement that selected industries be somewhat founded on the use of natural resources was easily achieved given the level and type of manufacturing typical of small and medium enterprises in Guyana. On the other hand, the probability of them adopting EMS/CP was much more subjective given the very low levels of regulatory enforcement and investment in environmental management systems, clean production technologies, or pollution prevention outside of only a small number of multinational corporations operating in the mining and food and beverage industries. There are only two companies holding current ISO 9000:2000 (Demerara Distilleries, certificates and one ISO 14001, OMAI Mining Ltd.) There are currently no externally certified forests or forest product operations.

**Figure 4. Selection criteria used to identify industry sectors**

The criteria is quite limiting in Guyana because they disqualify most enterprises for a variety of reasons. Most companies that operate within multinational value chains that place premiums on environment, health, and food safety performance are large corporations in gold and bauxite mining, sugar processing and beverages and therefore fail the size requirements. As there is virtually no added value to the rice producing industry—where smallholders and allied buyers operate more than 50 percent of production—these large players are also excluded.

**Table 3. Relative weighting and ranking industry sectors against established criteria.**

	Export-Oriented	Value Added Processing	SME Role	EMS/CP Adoption Probability	Score & Rank
Wood/Forest products	3	3	3	3	12
Fisheries	3	3	3	3	12
Meat & Poultry	2	3	2	3	10
Mineral Mining	3	1	1	3	8
Construction	1	1	3	3	8
Fruit & Vegetables	3	1	2	1	7
Food & Beverage	3	1	2	1	7
Textiles/Garments	3	1	1	1	6
Telecommunications	2	1	1	1	5

Rating: (1) was credited to low or no relevance of the criteria; (2) for current medium relevance and some indication of potential feature application; and (3) was credited when there was a current and high level correlation with the feature.

The mining and quarrying sector is dominated by primary production, with little forward or backward integration. It is also dominated by a small number of multinational companies and thus did not meet the requirements set out in the TOR for consideration in this survey. The gold mining sector has for the past ten years been dominated by one large mining operation, i.e., Omai Gold Mines Limited (OGML). Smaller Brazilian mining operators have more recently entered the market but they, too, meet neither the size nor processing requirements established by GMA, although they are having significant environmental impacts. Different from the Omai's operation, those interviewed suggest that these new miners are more diffuse and more difficult to

regulate and are likely leading to proportionately more river and stream siltation, ponding, and water pollution from concentration operations. Also, localized deforestation, commercial bush meat and live game exploitation, and sport hunting exploitation may be occurring due to increased access to forests.

### **Gold Processing**

Gold smelting, where impurities and remnant mercury are vaporized, also has health and safety implication for smelting workers and possibly neighboring communities. These impacts are largely realized at the Guyana Gold Board smelting operations and meetings with the Geology and Mining Commission (GMC) suggested they are currently considering options for containment of volatilized mercury of this public company. Meetings with GMC environmental staff concluded that short of interventions in the primary extraction of minerals, there are very limited entry points for EMS/CP downstream in processing operations. Possible EMS/CP interventions at the retail and wholesale jewelers level were also discussed but discouraged given the number and size of small operators, high costs of small scrubbers, and relatively small gains in environmental performance likely to be achieved.

Based on these criteria and the rapid appraisal team's findings it is recommended that the GMA-IDB/MIF interventions focus largely on the wood products, fisheries and meat and poultry industries. It is believed that these offer the best potential to install EMS/CP at the firm level and that these clusters offer enough broad industry leadership, internal replicability, and value chain influence as to be excellent candidates to develop demonstration projects in technology, capacity building, and institutional strengthening within GMA.





## SECTION VII

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### Environmental Aspects & Impacts of Fishery Operations

#### Sector Organization & Management

Off-shore fishing in Guyana focuses largely on finfish and shrimp that is wild caught along the narrow shelf between the littoral zone and the edge of the continental shelf known as the “Guyana Banks”. According to the Caribbean Regional Fisheries Mechanism (<http://www.caricom-fisheries.com/members/guyana.asp>) nearly 90 percent of the finfish harvest is conducted by 1,300 small-scale artisanal fishermen, roughly half of whom are organized into cooperatives. The balance of finfish and approximately 20,000 metric tons of prawns, sea bob and shrimp are caught and processed by six industrial companies that exported approximately 10,000 metric tons of shellfish in 2002. Given the export importance of the shellfish industry, we believe this sub-sector or cluster fits the criteria for the proposed GMA project. Like the poultry sector, during the 1990s the wild caught shrimp sub-sector witnessed significant growth with the entry into the market of Pritipaul Singh’s investment, and the expansion of Guyana Seafoods Ltd., BEV Enterprises, and Nobel House Seafoods Ltd. As such, tonnage in the 1990s more than quadrupled that in the 1980s and this single seafood product now accounts for the same value of export earnings as the rice industry. According to data released in the Bank of Guyana Annual Report for 2002, rice exports were valued at US\$38.9 million while fish and shrimp combined were valued at US\$46.7 million. This development reflects the astounding expansion of shrimp production and slower rice production and weak prices for that commodity. All but one of the SME’s either export to North America and/or the Caribbean. Nobel House is the only entity currently exporting to the European market. The formal sector employs at least 5,000 people and at least twice that number are probably indirectly employed through allied services.

Seafood exports have also been stimulated by government support and subsidies which included duty free importation and accelerated depreciation of processing equipment. In comparison to neighboring countries and major competitors the Guyanese shrimp fishing industry is relatively unregulated with poor controls on the numbers of trawlers, harvest rates, and management of the fishery. Since cumulatively these practices are encouraging over harvest and a decline in sustainability they should also be considered a government subsidy.

While there may be insufficient fish waste volume currently to warrant more than one or two processors in the sector, it is an area that can be encouraged in order to diversify and expand the fisheries sector, encouraging better and more sustainable utilization of the marine resources and increasing the economic returns to operators in the sector. With an expanding poultry sector that depends heavily on imported feed concentrate; this is a potentially lucrative option. Furthermore, other uses of chitosan<sup>8</sup> (a by-product of shell fish) is in treatment of waste water to remove

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<sup>8</sup> Other uses of this product include its ability to bind with lipids, and as a weight loss agent, given its indigestible quality. It is also used as an ingredient in shampoo, to film coating for fresh fruits which Guyana exports significant quantities of, and wound and burn dressing in the medical field.

precipitates and toxic metals, such as mercury and lead, the former used extensively in the gold and diamond mining sector in Guyana. Additionally, other products that can be produced from shellfish waste include glucosamine and carotenoids. The former is an amino sugar and has a beneficial effect on treatment and symptoms of osteoarthritis as it helps regenerate joint cartilage. Carotenoids can be used in such primary applications as salmon and trout feed.

## Environmental Aspects of Fisheries

Environmental aspects and impacts of wild caught shrimp fisheries (“sea bob”, white belly shrimp, and prawns) in Guyana are broadly confined to either resource management and harvest operations or processing and marketing functions. Each of these have distinctive implications for EMS and CP improvements under the GMA support program.

Resource management and harvest issues in Guyana include catch restrictions and seabed management. At present there are an estimated 140 trawlers legally registered to participate in the formal fishing industry, which consists of both sea bob and finfish. Quotas are theoretically set by trawler capacity and number.<sup>9</sup> Trawlers are owned by the six seafood exporters and a number of private boat operators. Interviews, limited available statistics, and declared public policy indicates that the fishery is open to more trawlers than originally permitted (as much as 40 percent) and that declines are occurring in both average catch size and net tonnage. Many operators complain that over-fishing is becoming a serious threat to operations and that poor enforcement of regulations and illegal fishing are now impacting spawning beds.

The life cycle and spawning habits of the Guyana fishery are poorly understood and the seabeds were recently closed for a trial six week period. Suggested demersal finfish sustainable yields are being exceeded and the maximum sustained yields for sea bob and white belly shrimp were not established in the Marine Fisheries Policy of 1996, upon which the fleet size and harvest quotas were established. Prawns caught from more pelagic waters may not yet be exceeding sustainable limits. From a rapid survey of other wild caught fisheries in the region, Guyana appears to be under-managing this vital resource. Brazil, Ecuador, and Mexico have strictly established quotas, strictly regulated fleet size, well enforced resting seasons, and on-board catch verification. These interventions in harvesting and sea bed management through demonstration projects would be difficult. However, a thoughtful review of best practices from other shrimp fisheries and development of some guidance through review and documentation of best practices in neighboring fisheries (e.g. including harvest management, quota and boat regulations and resting, management of waste streams, health and safety management of processing etc.) could be summarized during the first phase as a manual for presentation to the Trawler Association.

“Some of the demersal species are showing clear signs that they are being exploited at an unsustainable rate, particularly prawns, sharks, and mackerel.”

Guyana National Fisheries Policy, 1996

<sup>9</sup> According to the National Development Strategy the trawler fleet is classified in terms of their operations (prawns, seabob/finfish, finfish). The prawn vessels operate as a limited-entry fleet with the upper limit being 80 vessels. The seabob/finfishing fleet’s upper limit has been set at 30 vessels but appears to be exceeded. A smaller number has been established for the seabob/finfishing fleet because of uncertainty about the seabob resource, and because of the fact that these vessels operate within the breeding and nursery grounds of the marine fishery. Local trawler owners and operators have all moved into seabob/finfish thus ignoring the upper limit for seabob trawlers. The Fisheries Department is reviewing catch data and is in discussion with industry to change the vessel limits to 75 for prawns and 45 for seabob which will institutionalize over harvest.

Based on this documentation of current practices elsewhere a thorough review of management practices and regulations in Guyana could be conducted and a “gap” analysis benchmarking the industry in relative terms developed. This analysis would be the logical basis for identification of strategic EMS and CP/P2 interventions and rationalize any shared investments GMA might consider.

The most significant environmental aspects and impacts of the processing result from the shelling and packaging operations. The six largest operators each currently process 50 to 100 tons of sea bob, shrimp and prawn daily through recently purchased, modern equipment. Recovery rates are in the 40-45 percent range of live body weight, most prawn is sold as shell-on tail, and sea bob is sold as headless/shelled white meat into North American markets.

In comparison to other fisheries in the region, which require at least primary water treatment to remove BOD and some suspended solids, these are discharged directly. The main by-products are an estimated 150-180 tons/day shrimp heads and shells which are flushed directly and untreated into the Demerara River every day.



Figure 5. Improved management of fuels and lubricants lowers operating and remediation costs. (Photo: D. Gibson)

While the processing of shell-fish waste has been identified as a viable and potentially lucrative venture that could greatly aid in revenue generation and employment creation, only a single company, Bounty Farms Limited, is processing fish waste into chicken feed. While there may be insufficient fish waste volume currently to warrant more than one or two processors in the sector, it is an area that can be encouraged to diversify and expand the fisheries sector, encouraging better and more sustainable utilization of the marine resources and increasing the economic returns to operatives in the sector. This is a potentially lucrative option due to the expanding poultry sector that depends heavily on imported feed concentrate.

“The setting of this number (trawler fleet size) is influenced not only by the paucity of information on the sea bob resource but also by the fact that these vessels operate within the breeding and nursery grounds of the marine fishery”

Guyana National Fisheries Policy,  
1996

Other uses of chitosan<sup>10</sup> (a by-product of shell fish) are in treatment of waste water to remove precipitates and heavy metals including mercury and lead from in the gold and diamond mining sectors outside Guyana. Additionally, other products from shellfish waste that are now commercially available include glucosamine and carotenoids. The former is an amino sugar and has a beneficial effect on treatment and symptoms of osteoarthritis as it helps regenerate joint cartilage. Carotenoids can be used in such primary applications as salmon and trout aquaculture. Chitosan and other trademarked products are also under review by the U.S. and European organic standard bodies as a viable inert adhering body for organic pesticides.

<sup>10</sup> Other uses of this product include its ability to bind with lipids, and as a weight loss agent, given its indigestible quality. It is also used as an ingredient in shampoo, to film coating for fresh fruits which Guyana exports significant quantities of, and wound and burn dressing in the medical field.

## Suggested Interventions for EMS/CP in Fisheries

The most appropriate interventions to the GMA/IDB/MIF programming are geared toward improving waste management and recovery rates through the use of currently discarded waste. While improved adherence to regulations and codes would limit overfishing and sea bed damage, it is believed that improvements in quality and safety management systems offer the best cost-driven and continuous improvements in trade competitiveness.

## Integrated Quality, Food Safety & Environmental Management Systems

Through management systems enhancements in monitoring trawler maintenance, better documentation of harvest records, attention to refrigeration systems, cost controls for pumped well water, managing waste to increase revenues, the ability to meet the quality and safety needs of dynamic buyers would be significantly enhanced. Both Stemsrudhagen<sup>11</sup> and Cato<sup>12</sup> have documented the economic and trade benefits of implementing joint food safety and quality management systems. Cato shows that use of ISO standards cumulatively helps producers meet changing product and market standards by improving line management authorities, accelerating change management and system redesign, monitoring and real-time benchmarking of performance, and stepping up to buyer and regulatory auditing systems which are becoming more complex. Since most or all of the major six integrated exporters have met some or all HACCP, the option of improving overall production and processing to a more integrated quality standard such as ISO 9000 would allow organizations to meet multiple standards and individual buyer requirements with agility and cost effective internal control systems along the entire value chain. This would include harvest and trawler operations, processing, packaging and transshipment, and provide the necessary internal control systems to document entire chain-of-custody or “shelf to shelf” inventory management. The other standards for quality systems contain parts of this one, and consequently the contents of all the standards can be described by focusing on ISO 9001:2000.

### Measures in Fisheries

Harvest Rates  
Total Net Yields  
Trawler Maintenance Records  
Recovery rate & derivative products  
Total Suspended Solids (TSS);  
Biochemical Oxygen Demand (BOD);  
Ammonia, bleaches & surfactants  
Oil and grease accumulations;  
Levels of salts

## Quality, Environment, Health & Safety (QEHS) Capacity Building

*Installation of integrated (QEHS) management systems* at the individual firm level is possible given the six major operators current management. All of these operations are currently HACCP certified and each has good internal control systems to help establish and benchmark progress. However, given political sensitivities about supporting individual and already well established firms, the GMA demonstration and capacity building efforts should be focused on developing a joint implementation project where the firms can be cooperatively moved through the ISO 9000 series as a group. This would reduce the costs per factory to install the standard and systems improvements, help them collectively identify pilot CP interventions, and shore up their association.

<sup>11</sup> Stemsrudhagen, Jan I. 1997. Is ISO-certification profitable? a study of the quality costs in Norwegian industry. In *Proceedings of the 41st Congress of the European Organization for Quality*, pp. 333-344. Trondheim, Norway.

<sup>12</sup> Cato, J.C. 1998. Economic values associated with seafood safety and implementation of seafood Hazard Analysis Critical Control Point (HACCP) program. *FAO Fisheries Technical Paper*. No. 381. Rome

*Clustering management system certification of several of the most significant exporters could lead to cost-sharing by industry to meet the IDB/MIF requirements (1/3 of the costs will be contributed by other, non-MIF sources). This could provide a boost to a struggling association of trawler operators and provide an entry point into leadership companies which could have positive consequences for harvest operations—trawler and fisheries management—as well as processing, packing and marketing to buyers. A short expert-based consultancy is needed to establish firm-level capacity to implement to the various standards, an implementation plan, cost sharing structure, and budget for the grant and/or demonstration project.*

*Strengthening the Guyana Trawlers Association by improving internal communication, sharing advocacy potential, and collective attention to investment and market opportunities could have long-term benefits to the fishery and its dependent community. Another product that could come out of joint implementation (above) would be improved agreement and political clout with regard to trawler entry and the possibility of protecting the industry from inefficient and illegal trawlers. A strengthened association could also work more effectively with the National Fisheries Commission to establish and regulate trawler and harvests. It would also be vital to developing parameters and tracking systems to monitor the health of the fishery, establishing “best practices”, and promulgating them through BMP manuals and extension materials, which could be jointly organized with the Fisheries Commission.*

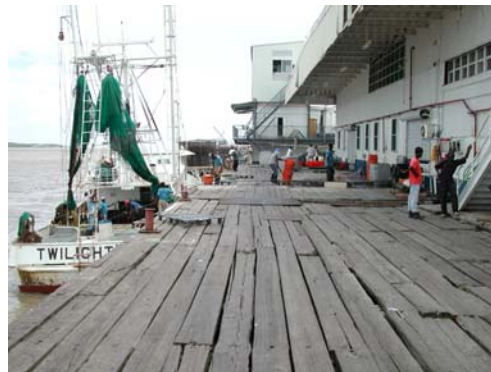


Figure 6. Trawler and marina operations could be significantly enhanced through installation of environmental management systems.  
(Photo: D. Gibson)

## Waste Reduction and Management

*Increasing net useable yields is probably the single best method of reducing waste. During the consultancy mentioned above an acknowledged expert in current marketing and production schemes would identify methods being used elsewhere to improve net useable yields. The peeling of shrimp not only generates the waste, it also generates the white meat product which is worth less than “head-on” shrimp in similar markets (largely Europe). Two of the current shellfish exporters are already certified to the EU Marine Fisheries Standard and with appropriate market contacts they may be able to enter into new “head-on” or “shell-on” markets. The sizing of sea bob and the fisheries’ potential to compete in a head-on marketplace must be carefully reviewed by an expert with yield management experience from other markets, familiarity with buyers’ current requirements, and intimate knowledge of the required and extant processing capacity. The draft scope of work would orient such a consultant.*

### EMS Foci:

- Docks & receiving area
- Washing area
- Dressing area
- Smoking room
- Salting rooms
- Refrigeration units
- Packaging units
- Product dispatch area

*Primary water treatment of waste offers the next best opportunity for clean production. Identifying and assessing the financial and environmental values of reducing suspended solids*

(TSS) and removing oxygen depleting organic compounds (BOD) should be considered. Simple aerated retention ponds could help reduce TSS and BOD. Various options for digesting waste and settling out particulates are available but most require certain minimum operating volumes and shared facilities between two and three firms. Beginning such an assessment by reviewing the best practices in other regional markets and production facilities would make good sense.

*Identifying new products and markets for current waste streams* offers perhaps the third best option for installing CP/EMS in the marine fisheries sector. As mentioned above there are numerous international pharmaceutical, health care, and agrochemical uses for chitins of varying degrees of purity. There are numerous aquaculture operations around the world where such wastes are primary feed ingredients and there is already an example of chitins being used in local poultry operations. The viability of such products is largely determined by the volumes, their protein concentrations, and the commercial economics of market entry. This must be determined by an expert intimately familiar with such products during the conduct of a market assessment. Most of these products are derived from waste using caustic soda and other alkaline agents which are not without collateral environmental impacts, (ponding and percolation area clearing, odors, secondary waste) which need to be evaluated. It is recommended that GMA consider co-funding a market analysis of chitin products through the IDB/MIF.

*Improving knowledge management within fisheries management* would be a final area of intervention that GMA should consider. By helping trawler operators and processors begin to better understand the population ecology of their principle species, sustainability and access to markets may be enhanced. This would include improved information templates and information management systems that would better document the catch and help to depict the condition of the fishery. Simple hand-held GPS systems could help map catch information, improve inventory accuracy, and be easily downloaded into modules which could change management practices. Working with trawler association boat crews, and based on a comprehensive review of neighboring and competing countries regulations (catch restrictions, resting practices, on-board survey methods etc.) a GMA consultant could begin to organize catch information.

**Illustrative Scope of Work**  
**Review and Evaluate Clean Production Options in Shrimp Processing to Improve**  
**Net Useable Yield and Waste Water Management**

1) Review Shrimp Processing Industry:

- a) Review infrastructure, working boats, principal companies
- b) Review seasonality, size distribution of shrimp
- c) Review Yearly production for each processing plant
- d) Review capture, handling, storage, and transfer of shrimp

2) Review Product Usage:

- a) Volume of product used in each product form
- b) Review current product forms, and current product yields
- c) Determine FOB product cost, as basis for incremental income yields
- d) Review equipment being used and processing methods
- e) Volume of shrimp by-products, generated as waste material
- f) Review current markets of shrimp production
- g) Review HACCP controls, EU certifications and ISO 9000 certifications

3) Improving Net Usable Yield:

- a) Based on size distribution, determine possible head-on shrimp applications
- b) Based on equipment and plant facilities, determine new product applications for shrimp resources
- c) With processing plant management, determine additional investments needed in order to improve net usable yield and estimate yields based on incremental income
- d) Determine possibility and of value added processing, i.e. breeding, cooked etc.
- e) Based on waste flows from small count shrimp suggest alternate uses of heads, and shell
- f) Investigate low impact production technology for small scale production of shrimp meal, chitin by-products, and other fibrous carbohydrates

4) Waste Water Treatment:

- a) Determine waste water flow of major processing plants, and adaptation of current drainage to primary wastewater treatment
- b) Investigate adaptation of primary and secondary wastewater treatment to individual plants
- c) Determine possibility of grouping production plants for a district primary and secondary wastewater treatment facility
- d) Provide basic schematic of primary and secondary waste water facility for individual plant





## SECTION VIII

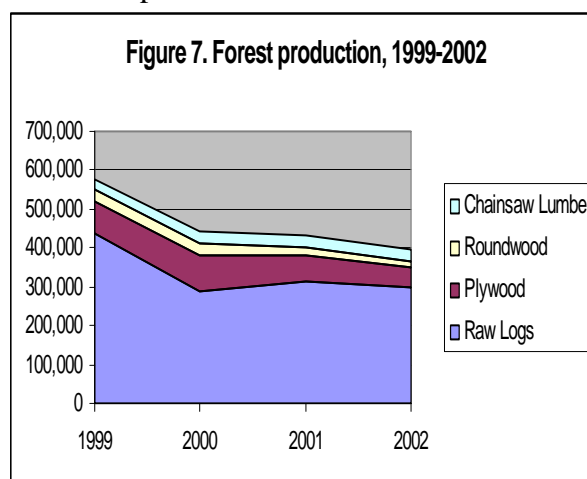
### Aspects and Impacts of Forestry

Forest sector employment is estimated at 20,000, split evenly between jobs within the formal and informal sectors. According to estimates made during the National Forestry Action Plan forest sector employment working papers, total employment has been estimated at 20,000. The formal operations (those whose roundwood processing or exports are tracked by the Guyana Forest Commission) account for somewhat less than half this number. The figure also includes seasonal and piece work employees in allied industries (e.g. charcoal, shingles, joinery, cane furniture, some wooden handicrafts, and indigenous resin and tisane collectors of medicinal plants, etc.). Figure 7 (below) shows the most recent information on shifting production trends of primary forest products.<sup>13</sup>

Forest production remains dominated by the production of raw logs, 98 percent of which are exported to Asia (India, Taiwan and Thailand). Plywood production ranks a distant second with approximately 50 percent of exports destined to North America and the balance split between the Caribbean, Europe and South American countries. Round wood production of (largely debarked Greenheart marine pilings and Walaba utility poles/posts) accounts for a shrinking percentage of production with, again, approximately half of production exported to North America and the balance split between the Caribbean and Europe.

Chainsawn lumber and splitwood used for shingling and stave comprise a last but stable component of production and exports with more than 50 percent of production selling into Caribbean markets and the remainder sold in either European, American and Asian markets.

The most consistent feature of forest production and export trends tends to be significant and regular swings in production demarcating a buyers market and limited processing capacity. Inefficiencies in forest product transformation limit many smaller firms' ability to provide adequate volume and quality and acquire longer-term positions in more lucrative and value-added markets. With the exception of three large Asian partnerships that are exporting logs and serving construction grade plywood markets, foreign direct investment in processing capability is stagnant, if not declining. Most small-medium wood processors appear to be operating well below 50 percent of capacity either due to obsolete equipment or the necessity of competing with the three large conglomerates for dependable log supplies. There are a small number of small forest products companies that conduct limited processing and export sales largely to the Caribbean region. Several processors described problems in the concession



<sup>13</sup> Guyana Forestry Commission. 2003. Quarterly market report 2003/3.

management scheme and end market requirements that continue to erode Guyana's ability to compete in anything but the Caribbean market for construction materials.

It appears, however, that there remains significant potential in small and medium specialty wood (decking and exterior facing) and furniture markets. There are also some impressive producers expanding the use and integration of wood and cane products into a potentially lucrative furniture market. Lastly, there are established and perhaps underexploited markets for non-timber specialty markets including gums and resins, forest fruits, spices, and ecotourism. The potential in finished exterior products, moldings, and furniture is limited by the size of individual operators and very limited kiln drying capacity. Finished furniture manufacturers also have difficulties in finishing work, quality management, and rising energy costs.

### **Environmental Aspects and Impacts of Forestry Operations**

The predominant aspect of wood products development can be easily segregated into forest management and harvest operation, transportation of logs or lumber from the forest to mills, and the conversion of raw or semi-processed forest products into wood products.

The planning and management of forest extraction is arguably the most expensive and complex aspect of the sector and has historically been the focus of most environmental and social attention. The obvious large environmental impacts of wood products development are localized deforestation, including reduction in carrying capacity of wildlife, changes or losses in species diversity, increased erosion and siltation due to loss of protective cover, impacts on indigenous cultures which historically depend on forests for livelihoods, and larger scale aspects including changes in carbon stocks and georegional hydrology.

The transportation of logs to processing facilities involves road planning and construction, development of landings for loading, management of vehicles and loading equipment, establishment and maintenance of laborers. Transportation of wood products to mills normally overlaps with management and extraction operations and the environmental impacts are nearly the same with the exception that roads have additional effects on surface water courses and can provide access to unforeseen and unregulated post harvest activities which tend to accentuate the other environmental impacts already mentioned.



Figure 8. Waste from wood processing clogs local waterways, creates health and safety hazards, and produces odors which offend local communities. (photo: D. Gibson)

Within wood processing the environmental issues are most often forest processing (which is sawing of logs into rough boards), chainsawing or milling of boards and logs at more centralized locations, and secondary processing which may result in drying and milling of plywood, furniture, splitwood shingles, and other derivatives<sup>14</sup>. The environmental impacts in processing

<sup>14</sup> e.g. Some non-timber products such as Manicole Palm, Mangrove Bark, and Wattles are harvested in small volumes and exported without adulteration or processing. They are important to the overall economic and ecological health of forests but their low volumes, predominant use in local markets, and little if any value-added processing limits our attention to them in the GMA/IMF context.

shift from broad ecological considerations toward health and safety of workers, waste stream impacts on operations and local communities, and management of water and energy consumption at processing facilities.

**Environmental Impacts in Wood Processing**

- Soil & ground water contamination from preservatives
- Worker & neighbor exposure to noise & dust
- Fire hazards and fuel stock management
- Solid waste management & disposal
- Transportation in sensitive areas
- Worker injury & death

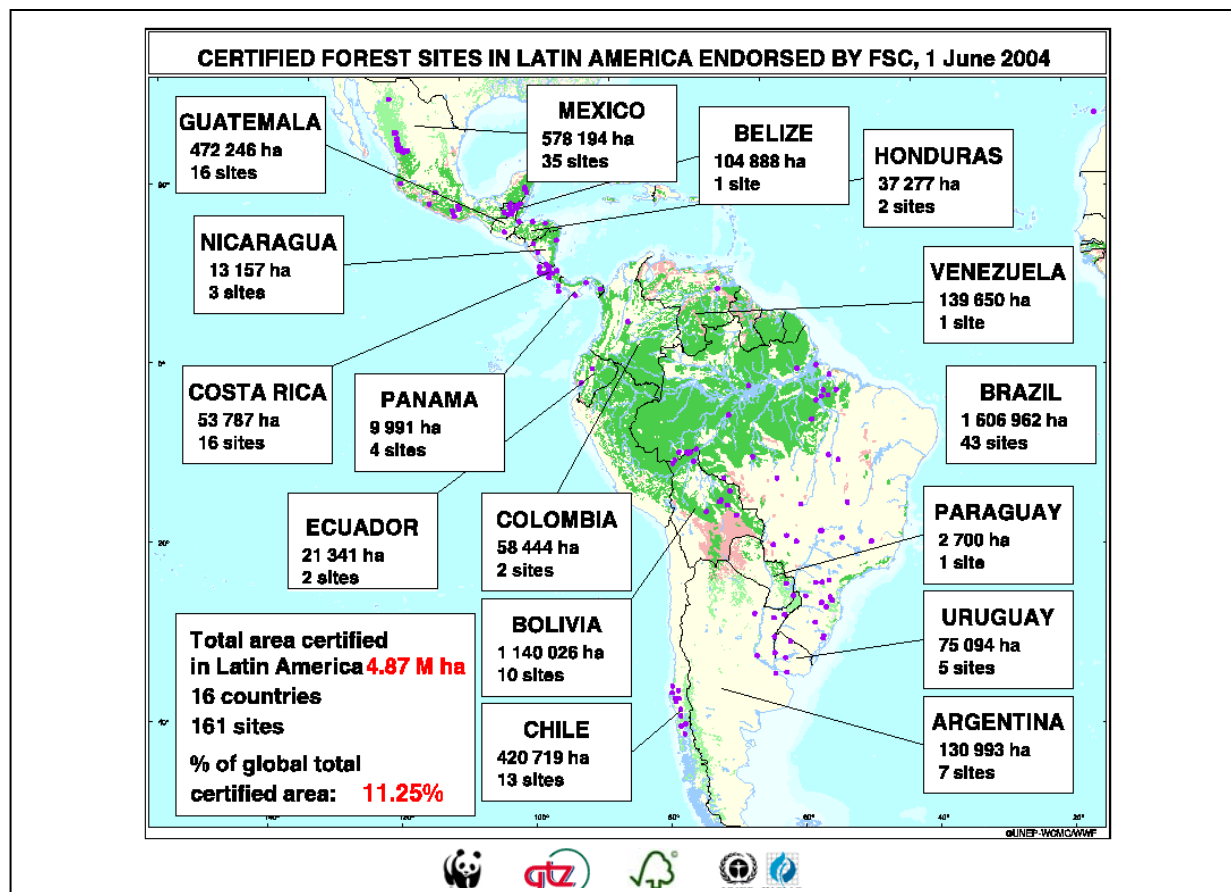
**Suggested Interventions for Forestry and Wood Products**

Interventions in forestry and wood products should focus on changing management systems in tandem with installing small clean production demonstrations. While suggested demonstration investments in saw mill waste reduction, drying technologies, and finishing work can add important value, they will be

more effective if conducted using a value chain approach.

*Conduct nominal and effective protection analysis on exports.* GMA's interest in spurring investment in forest processing requires a clearer understanding of the value chain and the policy context which currently limits such understanding. There is considerable debate around the promulgation of a log export ban in order to increase value-added processing and protecting small forest industries. The notion that increased access to logs will stimulate direct investment in processing is neither new nor substantiated by good economic data in Guyana. Studies conducted elsewhere in Central and South America<sup>15</sup> concluded that such prohibitions have extremely high social and economic costs, further protect inefficient firms with public equity, and do not lead to investments in processing. In fact, many studies conducted elsewhere suggest that such subsidies can stimulate "value subtracted" and timber mining and can represent an anti-forestry bias. Such policy decisions must be founded on empirical data that carefully and transparently reflect the real value of primary, secondary, and finished (FOB) forest products using residual pricing analysis. The economic impacts of tariff and non-tariff trade barriers, including log export prohibitions, can be determined by calculating nominal and effective trade indices. Obtaining good residual pricing analysis is critical and will require "blind" data that may be commercially sensitive. Blended stumpage and roadside prices from several concessionaires and processing firms and exporters improves the result. To be effective this analysis must be conducted in close collaboration with industry and effectively engineered into the dialogue currently being organized by the Forestry Commission. The results should be made widely available and form the basis for an industry referendum through public roundtables.

<sup>15</sup> Stewart, R and D. Gibson. 1995. Environmental and economic consequences of forest and agriculture sector policies in Latin America: A synthesis of case studies from Costa Rica, Ecuador and Bolivia. In: Readings from workshop on government policy reform for forestry conservation and development in Latin America. IICA/IDB/World Bank. San Jose.



*Conduct auditors training for forest certification.* There is significant and important interest in establishing and using international forest management best practices and independently verified certification and labeling systems in Guyana. Although there may arguably not be price premiums for certified products, the proliferation of these standards in the Americas are quickly becoming technical barriers to trade within private value chains that are conducted well below WTO/GATT intervention capacity. Within many of Guyana's neighboring countries, certification is becoming critical for access to markets.

There is currently no capacity to implement or audit to voluntary international standards for sustainable wood products. Although Guyana has requested official recognition and conformance assessment for its own national standard under the Forest Stewardship Councils Principle and Criteria (P&C) there is no local auditing capacity which will, eventually, force interested forest managers or wood products producers seeking chain of custody certification to use expensive off-shore assessors. Several companies including Barama are now implementing the FSC standard and anticipate seeking certification within the year. Several other NGOs and furniture manufacturers are also investigating the use of FSC or are already beginning to install elements of the P&Cs. An outstanding intervention that should be considered by the GMA grant facility should be the conduct of an assessor training course with an established and FSC-

accredited training body. This practical 4-5 day course could be sponsored by GMA and jointly conducted with one or more organizations with training objectives including Iwokrama and the University Forestry Department. Numerous commercial forest products companies appear willing to send staff and building such assessment capacity into emerging business development service providers (similar to that discussed above in ISO 9000:2000 in fisheries). Both the Rainforest Alliance and the Société Générale de Sure (SGS) have established courses that would improve understanding and functional capacity.

*Joint ventures for chain of custody forest certification.* Building upon the assessor capacity established in the suggested training (above), GMA should then consider letting a competitive grant for supporting the establishment of a pilot certification for an integrated medium-sized wood products organization. Since certification can be established for the forest, the products which emanate from certified forests, or both, it is suggested that GMA also support a pilot where chain of custody certification is sought for finished products selling into established markets. This would mean supporting either an integrated (forest manager, processor, retailer) or helping forge new linkages among current members of these value chain players. Discussion with several producers interested in combining timber and non-timber products into a single finished furniture product offers exciting opportunities to help build industry awareness and initiative. Since there is installed capacity at all three levels an innovative joint venture could be formed which would also allow installation of clean production technologies in drying, recycling, and finishing (see below) with more equitable benefit distribution.

*Install 2-3 pilot CP interventions to increase quality and pollution prevention.* Three options for reducing the environmental impacts of wood processing are readily apparent and worth considering as GMA pilots. It appears that all three would have good chances for replicability in multiple small and medium size wood processors. All have been successfully implemented elsewhere with measurable reduction or elimination in waste streams. All three would also likely be interesting enough to be jointly financed by pilot firms themselves. Each option would require limited expertise in the research and design of suggested systems but none are particularly complicated. Under ideal circumstances these interventions could be sequentially implemented within the same facility and, as such, would illustrate well the notions of continuous improvement at the heart of an environmental management system:

- *High efficiency, small scale kiln dryers* for furniture, decking and molding producers. Numerous technologies have been developed and successfully deployed to reduce energy costs, improve quality, and eliminate sawdust and other waste. Improved kiln technology could be easily fitted into upper end furniture (wood and cane) makers' current lines and is generally an important step in moving into higher quality markets. Cost and environmental efficiencies can be easily monitored, and several firms indicated interest in technologies that have been developed in Brazil, Bolivia, and Peru under similar conditions.
- *Vacuum dust recovery system* located at primary and secondary milling stations helps to reduce air-borne particulates from all operations with positive benefits in finishing quality, employee health and safety (reduced absenteeism from respiratory ailments), and concentration of waste for either heat/steam generation or disposal. Installation of

vacuum operated systems would make best sense in products lines requiring high finish quality (furniture) and in tandem with kiln drying boiler technologies which can flash burn waste.

- *Water curtains for spray finishing booths* are a good and inexpensive way of improving furniture, finished trim molding, and flooring quality by reducing refinishing costs and minimizing loss of expensive finishing chemicals. Water curtains simply recycle air through a water apparatus that concentrates spray into a waste water stream that can be then disposed of. Curtains can significantly reduce employee exposure levels to toxic solvents and are usually a first step in moving to less toxic finishes, reduced volumes of finishes, and improvements in overall finish work.

## SECTION IX

### Poultry, Meat & Dairy

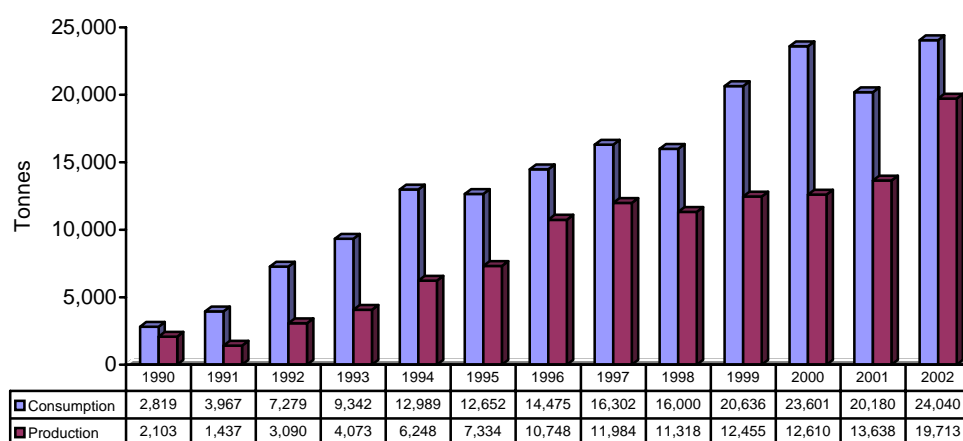
As stated earlier poultry is the largest value-added agriculture sector at present, although not yet exporting. Since allied feed industries and processing issues within poultry reflect issues identified in both dairy and meat processing we have concentrated on poultry as a lens for these others.

Poultry meat output increased by approximately 135 percent between 1992 and 1995, and more than 200 percent between 1996-2002 (Figure 9) but national consumption still outweighs production. However, production in several urban markets (particularly Georgetown) exceeds demand and several producers are moving toward exports to regional Caribbean markets to stimulate price improvements.

Investment in the industry has been largely dedicated to increasing the number of producers, not investments in technology per se. The industry is quickly shifting from a dozen vertically integrated producers to more specialized operators occupying intermediary production roles (eggs, chicks, fattening, slaughter, and processing). In 2002 it was estimated that the industry comprised approximately 3,400 enterprises including 4 processing plants, 50 commercial firms, 300 pluck shops, 3,000 small farmers, 4 feed mills, and 12 hatcheries (Bynoe, 2003).

Independent small farmers operate 'pluck shops' where they process their own live birds for sale to housewives and to small restaurants. There are also a few small processors without farms. The small processors account for approximately 60 percent of the local production of broiler meat. The majority of produce is marketed as fresh/live whole chicken i.e., birds freshly killed, processed and sold immediately or kept at room temperature before sale.

**Figure 9: Total Production and Consumption of Poultry Meat, 1990 - 2002**



Ministry of Fisheries, Crops and Livestock and the Statistical bureau, (August, 2003)

Like the primary producers, the poultry-processing sector is also dualistic, combining on the one hand a few established manufacturing enterprises and, on the other, a host of small operators. The large broiler processors account for 40 percent of all local production. Bounty Farms is one of the large companies processing 40,000 birds per week and accounting for an estimated 20 percent of all local production (Table 4).

**Table 4. Poultry Processing**

Processor	Processing Capacity (bpw)	Processing Throughput (bpw)	Percent Utilization
Bounty Farm Ltd	45,000	40,000	89
Lucid Enterprises Ltd	13,500	13,500	100
Toucan Farms	6,500	6,500	100
Rambarran Poultry Farms	5,000	5,000	100
DIDCO	120,000	120,000	100
Buddy's	40,000	30,000	75
Others (495)	90,000	90,000	n.a.

Source: Various sources (n.a. = not available)

There are also several medium sized processors who have smaller scaled operations processing between 1,000-5,000 birds per week. These processors tend to source their live bird supplies from their own farms as well as from independent farmers. Some have hatcheries and/or small feed-mills (Table 5). Utilization rates are variable as are the definitions (e.g. live weight, slaughtered weight etc.) used to measure efficiency and utilization.

The food service sector has been one of the main drivers in expanding the consumption of broiler meat in Guyana. These include the emergence of fast food outlets like KFC, Royal Castle, and the proliferation of Chinese restaurants. Due to the express requirement of working with exporters the food service sector was not further considered for GMA intervention.

**Table 5. Feed Milling Capacity and Throughput (2002)**

Feed Milling Company	Manufacturing Capacity (tons/yr.)	Manufacturing Throughput (tons/yr.)	Utilization percent
Guyana Stock Feeds	28,000	14,000	50
Bounty Farms Ltd	7,000	650	93
Eden Poultry and Hatchery	3,000	3,000	100
Guyana Livestock Feed Manufacturers	65	50	77
Red Rooster	65	50	77
Commodities Incorporated	65	50	77
Other	65	50	77
Total	38,260	23,700	62

Source: Various Sources

The primary concern of the poultry industry in Guyana is potential loss of domestic market share to cheap imports. Processors in Guyana have significantly higher grow-out cost than those in Brazil and the USA but are generally competitive in terms of processing cost. The efficiency analysis demonstrated that due to the relatively high price of whole broiler and breast in



Barbados and St. Lucia, Guyanese, as well as other producers in the region, can penetrate this market as their export competitiveness index was below one<sup>16</sup>. However, the only other possibility for intraregional trade in the sector is to export breast to Trinidad and there is no real possibility currently for exporting out of the region. However the need for a more efficient, reliable and cheaper form of transportation and improved sanitary and phytosanitary (SPS) status in Guyana are very important concerns.

### Environmental Aspects and Impact of the Poultry Industry

The environmental aspects and impacts of poultry production operations are broken into aspects and impacts associated with bird production or the processing of birds into final products. The former are broadly based amongst nearly 3,000 producers of varying size while the processing stage is more concentrated. Since the team defined small and medium businesses as those employing more than family members and conducting business on established and registered business sites, the “bottom shop” producers and farmers are excluded.

As mentioned above the primary *aspects* of chicken husbandry revolve around the provisioning of inputs to operations including feed stocks, bedding, building materials for coops, and energy for temperature regulation and lighting. The most significant environmental *impacts* of production are localized surface and ground water contamination from excrement, environmental nuisance problems associated with sight and odors from operations, and solid waste problems from the disposal of used bedding, veterinary waste and pre-commercial mortality.

The siting of farms is most often non-permitted and thus they are often located within residential communities, adjacent to water courses, and atop very shallow water tables, intensifying waste management issues. The absence of managed landfills throughout most of Guyana ensures that waste is disposed of through anything but large operations in an ad hoc and unregulated way, meaning that veterinary waste, bedding and dead birds are most often buried close to raising operations. Evidence of ground and surface water pollution from nutrient laden waste seeping from coops is well evident and well described. Given the shallowness of many of the littoral production sites this contamination flows easily into surface waters, fouling streams and contributing to watercourse strain.



Figure 10 Typical mid-size poultry operation.  
(photo: D. Gibson)

Waste water from only the larger processors receives primary treatment and is then discarded directly in local rivers with evidently high content of fats, suspended solids and high BOD concentrations. Solid waste generated tends to be unseparated and deposited in local landfills or municipal facilities where it fouls air and can pollute surface and ground waters.

<sup>16</sup> These countries include Guyana, Suriname, Trinidad and Tobago and Jamaica.

## Suggested GMA Interventions in Poultry

*Conduct comprehensive review of Caricom & member SPS/Veterinary requirements and poultry tariff structures for export of meat and poultry (UG).* It appears that the most significant obstacle to improving interest in environmental management may be the very low current broiler meat prices which many producers claim are well below cost. Interestingly, the major bottleneck to improving prices may be overproduction due to an inability to export surplus production. The export problem seems to stem from either the inability to deliver a credible veterinary export certificate, the acceptability of GoG-issued certificates in Caribbean countries, or both.

Development of a manual with the specifics of Caricom members' SPS requirements and those prescribed by Caricom would be helpful. Country-specific tolerances, information on authorities and procedures, and identification of best practices in achieving these requirements could help small and medium producers meet these requirements. A two week consultancy by a regional poultry and meat inspection expert would probably be adequate in developing the information which GMA could publish with the support of the Ministry of Agriculture who has expressed interest in such tools.

*Conduct conformity assessment of applicable SPS standards & identify gaps (GNBS)* – While the Caricom standards are key, the conformity assessment work underway at GNBS is also important to insure equivalency and provides the assessment, auditing, inspection and third party recognition systems required for international recognition and reciprocity. Without completing the conformity assessment, the benchmarking and laboratory capacity for assuring quality of a wide range of certificates will not be forthcoming and individual certification systems for SPS (or environmental management and health and safety) will not be applicable. GMA should carefully consider their interest in and support for the completion of the national conformity assessment for virtually all of the work areas described in this report.

*Develop waste & sanitation BMP manual for meat & poultry exporters and conduct seminars* – While medium and large poultry and meat producers have access to better and best practices for rearing and processing, most of the estimated 2,000 small poultry operators remain out of touch with environment, sanitation, and food safety practices and systems. Simple extension materials for best management practices for siting and waste management could make significant improvements in local conditions and could be done with small producers in mind<sup>17</sup>. This could be done through a GMA grant-sponsored website and development/distribution of BMP manuals for poultry, meat and dairy sectors.



Figure 11. Improperly sited raising facilities and inadequate attention to storm water runoff increases management costs and environmental liabilities.

*Develop small loan guarantee facility for improvements in poultry operations* - IDB/MIF could develop a pilot loan guarantee scheme that could provide low interest finance for a set of agreed upon improvements based upon the manual. \$1,000 - \$5,000 loans for specific investments with

<sup>17</sup><http://www.epa.gov/agriculture/anafobmp.html>; <http://www.ces.uga.edu/pubcd/B1230.htm>; <http://www.gov.on.ca/OMAFRA/english/environment/bmp/series.htm>;

demonstrable impacts on local environmental conditions. Small loans which may improve competitiveness would be determined during the suggested manual's development and would likely include a) construction of poultry manure storage and retention structures; b) purchase of poultry manure spreaders for allied (agriculture) industries; and c) purchase of composting equipment for on-farm composting of poultry litter and dead-bird carcasses. There is precedence for similar activities in critical watersheds<sup>18</sup> upon which such a low interest program could be established. Alternatively, USAID could consider supporting this initiative with Development Credit Authority support under the auspices of its forthcoming trade support project.



*Install and test primary water treatment of medium scale poultry processing plants and abattoirs.* This would require the use (2-3 weeks) of an expert consultation to determine the size, cost effectiveness, and technical feasibility of installing primary waste water treatments for medium scale processors. Several options must be costed and should include anaerobic lagoons<sup>19</sup>, various methods for waste containment and primary sorting of solids, impoundment for settling organics, and consideration of digestors. Degreasing of waste waters through traps and biological buffers (such as the grass strip technology at right) offers significant impacts if site investigations correctly gauge capacity requirements, size and shape restrictions, and attention to water table proximity.

<sup>18</sup> <http://www.dnrec.state.de.us/water2000/Sections/FAB/FABPoultryBMP.htm>;

<sup>19</sup> Anaerobic lagoons are most commonly used for livestock and poultry waste treatment. Anaerobic bacteria can decompose more organic matter per unit lagoon volume than aerobic bacteria and are predominantly used for treatment of concentrated organic wastes. Since the anaerobic process is not dependent on maintaining dissolved oxygen, lagoons can be much deeper and require less surface area. Anaerobic decomposition of livestock waste can result in the production and emission of odorous gases, primarily hydrogen sulfide, ammonia, and intermediate organic acids. An anaerobic lagoon can be properly sized and managed, however, to operate with a minimum of disagreeable odor.

## ANNEX A

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### Terms of Reference for the Implementation of an Environmental Survey

#### **Position(s): Environmental Expert(s)**

*Purpose of the Assignment.* To identify priority environmental concerns in Guyana's export manufacturing sectors and recommend firm-level activities and other interventions aimed at improving the environmental soundness and market acceptability of Guyanese products in international markets.

*Background.* Pollution prevention pays, and therefore it makes good business sense to invest in clean technologies and incorporate good environmental practice in design and planning. Meeting environmental standards is becoming increasingly necessary for firms to compete successfully in international trade. Environmental certification is becoming a precondition for access to some markets. The Guyana National Bureau of Standards (GNBS) has been working with industries to build capacity in environmental management systems following ISO 14000 standards. The GNBS is also developing a National Standard which meets the budget and needs of small and micro enterprises and which would start them on the road towards meeting international environmental requirements.

The Guyana Manufacturers' Association (GMA), the Environmental Protection Agency (EPA), and the Institute of Applied Science and Technology (IAST) are implementing an Inter-American Development Bank (IADB), MIF funded project which will provide small and medium size enterprises (SMEs) in export oriented industries with technical assistance to eliminate or at least reduce practices and processes that are not—or promise to no longer be—acceptable in international markets. The project will also provide mechanisms by which industries will improve their marketability by demonstrating eco-friendly processes.

The GMA has requested USAID/GEO project assistance in identifying the priority manufacturing sectors or subsectors where SMEs are in need of assistance in meeting clean production practices and in implementing environmental management systems. The survey is also intended to recommend possible interventions based on international best practices to improve the production processes and move the firms and the sector toward acceptable international environmental standards. As part of this survey, it is essential to recognize that the draft National Standard on Environmental Management Systems, as well as national regulations related to the environment (manufacturing, tourism, agriculture, mining, forestry, fisheries, and energy), reflect Guyana's approach to meeting international best practices, and should represent the framework under which the consultancy should be carried out.

Follow-up assistance will be provided through IDB MIF financing to implement recommendations and activities developed during the USAID/GEO survey.

*Approach.* The activity will be conducted in two phases. The first phase will entail an overview of the manufacturing sectors as they relate to environmental issues. During the initial phase the

consultant(s) will work closely with the GMA, the EPA and IAST. In meetings with the three partner organizations and in meetings with representatives of the manufacturing sectors and subsectors, the team will identify the priority sectors which will be the focus of assistance under the IADB project. Since the focus of the IADB program is on helping SMEs better prepare for and expand their export potential, a primary consideration is that the sectors or subsectors selected are currently exporting or have significant potential for exporting. A second consideration is that the sectors selected are dominated by SMEs. Finally, the sectors identified for final consideration should be those where the export potential is the highest and where interventions to improve clean production processes and sound environmental management have the best potential for improving export performance.

During a second phase, specific sectoral expertise will be needed to identify and recommend specific environmentally sound interventions, processes, methods, or programs to improve the environmental issues in the sectors identified during phase one.

*Specific Activities during Phase 1.* The consultant(s) will:

- Meet with the GMA, EPA and IAST to discuss the various sectors or subsectors, to be surveyed and agencies and organizations to be consulted.
- Meet with government ministries and agencies responsible for each sector (e.g. Ministry of Agriculture, Forestry Commission, etc.) and sector associations (Forest Products) to discuss the assignment, obtain views on priority problems and environmental issues. The consultant(s) should also meet with the GNBS to determine what standards have been or are being developed for each sector with respect to environmental management and regulations.
- Review national standards, regulations and best practices that are related to the environment.
- Meet with sector firms and agencies responsible for each sector to identify key environmental issues which either are presently or will likely in the future limit the ability to export, or may limit access to certain markets. Issues to consider for each include, but are not limited to:
  - Waste disposal and effluent discharge
  - Air quality and workers health and safety
  - Upstream and downstream processes which may impact product environmental soundness or exportability (e.g. logging practices and the impacts on wood products marketability, pesticide use and agriculture and agro-processing)
  - Degree of sector firms certified or preparing for ISO14001 or other environmental certification.
- In consultation with the GMA, the EPA and IAST, the consultants will identify those sectors and production or manufacturing processes which are the most critical in terms of environmental issues and concerns.

- For these sectors and environmental issues the consultant(s) will recommend possible actions and activities to eliminate, alleviate, and improve the processes that are not environmentally sound. These recommendations might include, but are not limited to:
  - Educational programs
  - Training in new processes and techniques which may be more environmentally friendly
  - Informational campaigns
  - Pilot projects and demonstrations
  - Matching grants to individual firms for technical assistance

*Deliverables.* The consultant(s) will submit a draft report prior to leaving Guyana which covers the following:

- Priority sectors and environmental issues identified to be the focus of future IADB MIF project funding and the reasoning behind the selection.
- A list of possible activities to be funded under the MIF project aimed at improving, if not eliminating the environmental problems identified.
- Identify the types of expertise (and recommended experts, if possible) that will be needed during Phase 2.

*Reporting.* The consultant(s) will report directly to the GEO Project Director

*Timing and Level of Effort.* April 2004. Approximately 10 days in country, including travel. One day preparatory work prior to travel to Guyana, 2 days for final write up after leaving.

## ANNEX B

### Meeting Schedule

Date	Company	Address	Telephone Number	Name of Person Met With	Comments
3. 31.2004	Guyana Manufacturers' Association	National Exhibition Complex, Sophia, Georgetown, Guyana	(592) 227 4295	Ramesh Dookhoo – President Derrick Cummings – Exec. Director Clem Duncan – Exec. Member	
3.31.2004	Environmental Protection Agency (EPA)	University of Guyana Campus, Turkeyen, Greater Georgetown, Guyana	(592) 222 6703	Mr. Doorga Persaud – Director Mr. Connor Fox – Senior Economist	
3.31.2004	Liana Cane Interiors Ltd.	1 – 5 Victoria Road, Sparendam, East Coast Demerara, Guyana	(592) 220 2751	Angela Sebastian – Admin Manager	Visit to the factory
4.1.2004	Guyana Forestry Commission	1 Water Street, Kingston, Georgetown, Guyana	(592) 226 7271	Mr. James Singh – Chairman	
4.1.2004	Guyana Geology & Mines Commission	Upper Brickdam, Stabroek, Georgetown, Guyana	(592) 225 2274	Ms. Karen Livan – Environmental Manager	
4.1.2004	United Nations Development Project	Ministry of Foreign Affairs Building, Takuba Lodge, South Road, Georgetown, Guyana	(592) 225 3166	Ms. Sandy Griffith – Project Manager	
4.1.2004	Ministry of Fisheries, Crops & Livestock	Regent Road, Bourda, Georgetown, Guyana	(592) 225 6768	Hon. Satyadeow Sawh - Minister	
4.1.2004	Forest Products Association of Guyana (FPA)	157 Waterloo Street, Georgetown, Guyana	(592) 225 9848	Mr. John Willems – President Ms. Mona Bynoe – Exec. Secretary	
4.2.2004	Guyana Poultry Association of Guyana	126 Quamina Street, Georgetown, Guyana	(592) 2266338	Mr. Lloyd Fung-a-Fat - President	An inspection of Fung-a-Fat Hatcheries was also made on this occasion.
4.2.2004	Guyana National Bureau of Standards (GNBS)	National Exhibition Complex, Sophia, Georgetown, Guyana	(592) 225 9041	Mr. Jowala Somai – Head, Management Systems Mr. Anthony Ross – Tech. Officer	
4.2.2004	Guyana Trawlers Association	Area K, Houston, East Bank Demerara, Guyana	(592) 622 8265	Mr. John Carpenter	Mr. Carpenter is the CEO for B.E.V. Precursors Ltd, a fish processing plant. BEV is a member of the association.

<b>Date</b>	<b>Company</b>	<b>Address</b>	<b>Telephone Number</b>	<b>Name of Person Met With</b>	<b>Comments</b>
4.5.2004	BEV Processors Ltd.	Area K, Houston East Bank Demerara, Guyana	(592) 225 2111	Mr. John Carpenter	An inspection of the Fish Processing Plant
4.5.2004	Inter-American Development Bank (IDB)	44 High Street, Kingston, Georgetown, Guyana	(592) 225 7950	Ms. Donna Harris, Project Manager	
4.5.2004	Liana Cane Interiors Ltd.	126 Quamina Street, Georgetown, Guyana	(592) 225 8404	Ms. Jocelyn Dow – Managing Director	Lunch meeting following site inspection
4.5.2004	Iwokrama Rainforest Centre	77 High Street, Kingston, Georgetown, Guyana	(592) 225 1504	Dr. David Singh – Consultant, Human Resources Management and Operations	Dr. Singh is the former Director of EPA.
4.6.2004	Iwokrama Rainforest Centre	77 High Street, Kingston Georgetown, Guyana	(592) 225 1504	Mr. Graham Watkins Executive Director	
4.6.2004	Bulkan Timber Works	Yarrowkarba, Soesdyke	(592) 624 9067	Mr. Howard Bulkan, Managing Director	
4.7.2004					Visited several poultry farms.
4.8.2004					Debriefing with GMA and the above-mentioned persons



## **ANNEX C**

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### Participants in the Gibson/Bynoe Debriefing

<b>Name</b>	<b>Position</b>
Clem Duncan	Executive Member, GMA
Mona Bynoe	Executive Secretary, Forest Products Association
Anthony Ross	Quality Inspector, Guyana National Bureau of Standards
Ramrattie Karan	Guyana National Bureau of Standards
Conor Fox.	EPA
Sandy Griffith	UNDP/GOG
James Singh	Guyana Forestry Commission
Leslie Romalho	Noble House Seafood
David Singh	Iwokrama
Lloyd Fung-a-Fat	Guyana Poultry Producers Association
Rueben Charles	Prittupaul Singh Investments
Frank Alphonso	Liana Cane Interiors
Elisa Florendo	EPA